

Data Analysis and Probability
Lesson 30: Permutations, Combinations,
And Probability
Math for Standards

Name _____

Date _____

The Fundamental Counting Principle tells us how many possible _____

we can have when two events are happening: If there are a possible outcomes on the first event and b on the second, then the total number of outcomes is _____.

If you spun a spinner with 8 possible outcomes and rolled a 6-sided die, then there are _____ possible outcomes.

A permutation will tell us the total number of possible outcomes when _____.
_____. That is, if you have the letters A, B, C, and D, how many possible ways can you arrange the letters?

The formula for a permutation is:

n is the total number of objects and r is the number of objects we take at a time.

A factorial is as follows:

A combination is similar to a permutation, except _____.

That is, if I had four books, how many different ways could I carry three of them?

The formula for a combination is:

We can use permutations and combinations to help find probabilities of an event happening:

Example 1: You have 6 pairs of pants, 8 sweaters, and 3 pairs of sneakers.

a. How many different outfits can you make if each outfit has one pair of pants, one sweater, and one pair of sneakers?

- b. How many more sweaters would you need to double your total possible outfits?
- c. What is the probability you will pick a specific sweater?
- d. What is the probability of picking a specific sweater with a specific pair of sneakers?

Example 2: Find the following permutations and combinations.

a. ${}_{12}C_2$

b. ${}_{11}P_4$

c. ${}_6P_6$

d. ${}_8C_3$

Example 3:

- In a class of 24 seniors, how many different sets of 2 students can be chosen to represent the class at a school meeting?
- From the same class of 24, how many different ways can two students be elected to be president and vice president?
- Why are the results different for parts a and b?